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USDA • Forest Service

FI&DM/MAG

forest insect & disease management methods application group

2810 Chiles Rd. • Davis, Ca. 95616

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NEWSLETTER

SPRAY DEPOSIT ASSESSMENT MANUAL PUBLISHED

The publication "Methods for Sampling and Assessing Deposits of Insecticidal Sprays Released Over Forests" is now available. This manual is intended to provide a state of the art reference on spray deposit assessment procedures for field experiments and pilot and operational control projects involving aerial application of liquid pesticides.

Two and a half years in preparation, this manual results from a need identified during a workshop, held in Davis in March of 1976, that was jointly sponsored by FI&DM/MAG and the USDA Expanded Douglas-fir Tussock Moth and Gypsy Moth Research and Development Programs. These three groups are the copublishers of this manual.

The manual consists of a number of individually authored chapters and subchapters compiled by Jack Barry of FI&DM/MAG, George Markin of the Pacific Southwest Forest and Range Experiment Station, Robert Ekblad of the Missoula Equipment Development Center, and Galen Trostle, formerly with the Pacific Northwest Forest and Range Experiment Station but now assigned to the Pacific Northwest Region (R-6).

The manual is designated as USDA Technical Bulletin 1596 and copies are available upon request from FI&DM/MAG.

SECOND DOUGLAS-FIR TUSSOCK MOTH MODELLING WORKSHOP HELD

FI&DM/MAG participated in a second technology transfer workshop on the Douglas-fir tussock moth family of models. This workshop emphasized the Stand Prognosis Model and its linkage with the Stand Outbreak Model.

The Stand Prognosis Model/Stand Outbreak Model linkage is capable of projecting long-range losses by Douglas-fir tussock moth outbreaks for stands in northern Idaho and adjacent areas of Washington, Oregon, and Montana.

The workshop was held in Fort Collins, Colorado, during November 1978. Representatives from the Intermountain and Pacific Northwest Forest and Range Experiment Stations and FI&DM/MAG introduced the models and provided practical exercises through simulation runs to the workshop attendees, which included silviculturists, land management planners, and timber and pest management specialists.

Computer programs for the Stand Outbreak and Stand Prognosis models have been installed at the Fort Collins Computer Center. FI&DM/MAG has been assigned responsibility for systems maintenance, documentation, and updating for the Stand Outbreak Model; the Timber Management Mensuration, Biometrics, and Data Processing groups of the Rocky Mountain Forest and Range Experiment Station in Fort Collins will provide the same services for the Stand Prognosis Model.

FOREST INSECT AND DISEASE INFORMATION SYSTEM

The need for formal identification of data required on the status of destructive insect and disease pests has been recognized for some time. This is particularly true in regard to assessment of impacts on forest resource systems for pest management decision making.

Data requirements differ according to planning level. On a Forest or District, detailed descriptions of major insect and disease losses on a management unit (stand or compartment) are needed in a format that is compatible with other resource information systems (soil, vegetation, topography, etc.) for selection of the most appropriate pest strategy.

At the Regional or national level, broad summaries of acres infested, mortality and growth impact by key insect and disease agents, and land ownership class on a statewide basis are needed to set priorities for research or action programs, adjust yield projections, provide data for accounting of expenditures and accomplishments, and to respond to inquiries and increased demands from Congress and the public.

Specific data requirements for the national planning level are being defined for implementation of a forest insect and disease data base. This data base will be known as the Forest Insect and Disease Information System (FIDIS). FIDIS will provide both graphic and tabular outputs summarizing the status of major pests. Data requirements definition and systems coordination are scheduled to be completed this fiscal year with a target of full-scale system implementation by FY 1981.

COMPUTER MAPPING DEMONSTRATION COMPLETED

FI&DM/MAG recently completed a demonstration of a commercial geographic data management system for storage and retrieval of insect and disease survey information. A final report is being prepared and will be available in early spring.

Project objectives were:

1. To evaluate an operational "state of the art" geographic data base system available from a commercial vendor for display and storage of forest insect and disease information.
2. To establish a benchmark from which to compare existing in-house mapping systems.
3. To provide acreage summaries of insect infestations by intensity class and ownership class.
4. To evaluate system capabilities for generating a sampling frame for mountain pine beetle multistage surveys.

COMARC Design Systems of San Francisco was selected to provide the necessary services for the demonstration. To the best of our knowledge, COMARC has the only operational system that meets our requirements. Specific features consisted of:

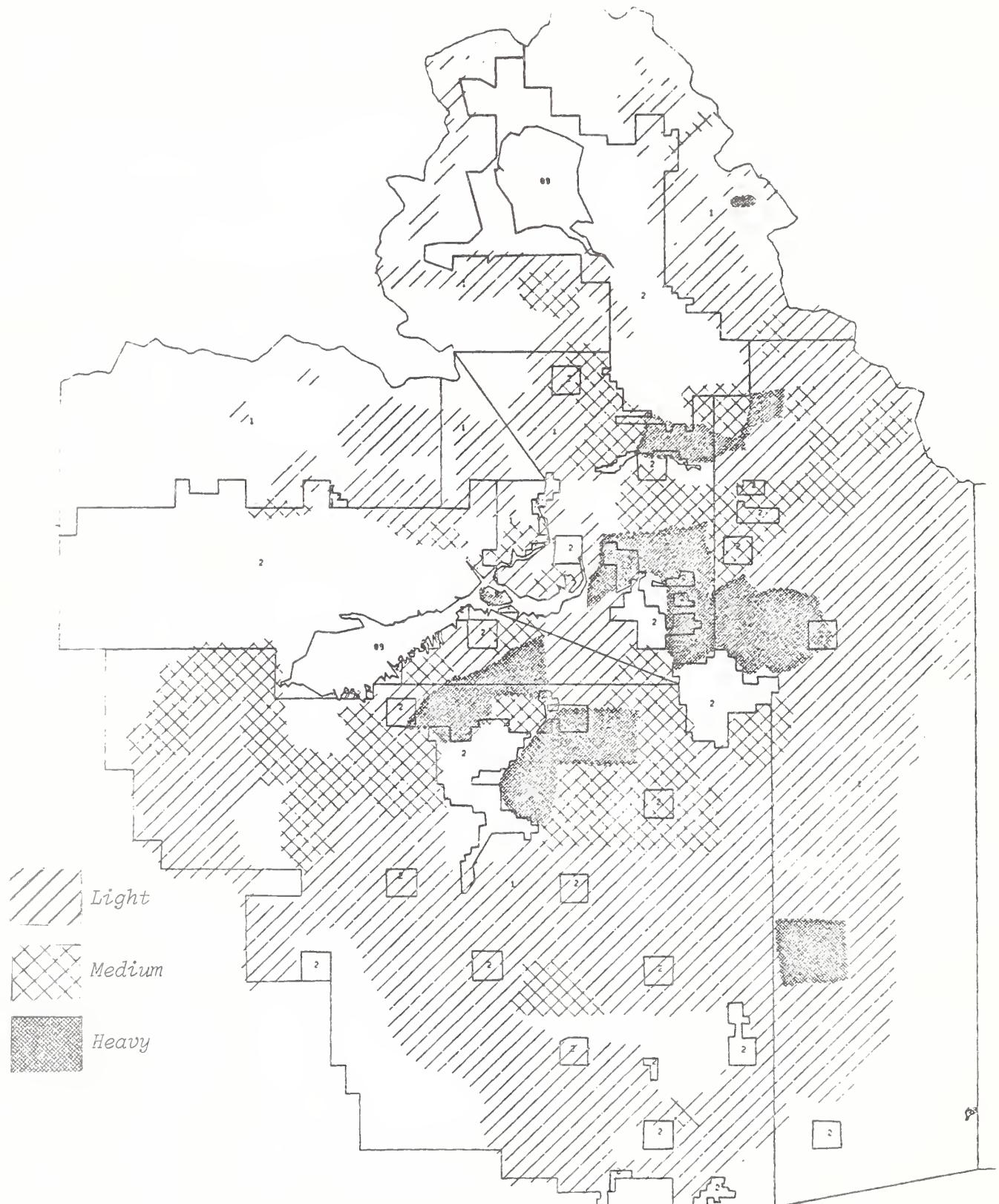
1. Ability to digitize directly from source maps. Mylar overlays are not necessary.
2. Ability to accept source maps in different scales.

* * * * * P U L Y G O N L A B E L I N F E S T R U T I P R I T L *

COMARC DESIGN SYSTEMS - SAN FRANCISCO		7 C1 1411					
CLIENT NO.	FILE NAME = P1MPOLUUS.MP	CLIENT					
PROJECT NO.	DATA TYPE = UNITSMP	DATA					
MAP TYPE	# OF LANDS = 12	LANDS					
MAP NO.	# OF POLYUNS = 471	POLYNS					
FILE TYPE	TOTAL ACRES = 351055	ACRES					
LAB LABEL	LABEL	LABEL					
LAB NAME	NAME	NAME					
NUM	CLASS	CLASS					
1	NAT. FOREST	1	1	230211.01	104	24.55	40.15
1	NAT. FOREST	2	1	70010.50	50	14.51	11.04
1	NAT. FOREST	3	1	53484.14	57	11.50	6.10
1	PRIVATE	1	1	11660.01	67	2.61	1.04
2	PRIVATE	2	1	7887.65	14	2.20	1.04
2	PRIVATE	3	1	4191.14	51	1.17	.58
98	WATER	1	1	241.01	11	.07	.34
98	WATER	2	1	128.47	14	.04	.07
98	WATER	3	1	41.02	5	.01	.04

* * * * * 471 POLYUNS UN MAP TOTALING 1041411.01 UNITSMP

1977 mountain pine beetle infestation area by intensity class and ownership,
Targhee National Forest



1977 mountain pine beetle infestation area by infestation class
and ownership, Targhee National Forest

3. Ability to digitize in arc polygon form, eliminating double trace and shivers in acreage calculations map outputs.
4. Ability to digitize in polygon mode (arc, point mode, grid mode, and line mode).

Results from the demonstration project are very encouraging. The system demonstrated its ability to provide the framework for an effective Forest Insect and Disease Information System. Tabular and graphic outputs are easily interpreted and can be displayed in a variety of formats or scales.

MOUNTAIN PINE BEETLE LOSS SURVEYS

Evaluation of multistage surveys for estimating losses caused by the mountain pine beetle over large areas continued during the 1978 field season. Two pilot surveys were conducted in Forest Service Regions 1 and 2, and consisted of a combination of aerial sketchmapping, aerial photography, and ground surveys designed to estimate number of trees killed and cubic-foot volume loss.

Surveys were conducted over the Gallatin, Beaverhead, and Flathead National Forests in Montana, where the insect is presently at epidemic levels in lodgepole pine forests, and on the Black Hills National Forest in South Dakota and Wyoming, where the insect is causing serious losses of ponderosa pine stands.

The Black Hills survey involved some significant changes in sampling strategy over the previous year in an attempt to reduce sampling error. A Probability Proportional to Size (PPS) approach was used for selection of ground samples. Resultant data analysis, now complete, showed that this approach significantly reduced sampling error; damage caused by the 1977 generation of mountain pine beetle was estimated with a 4.5% error on numbers of trees and a 7.3% error on cubic foot volume loss. This is a significant improvement when compared to the 40% sampling error achieved on both parameters during the previous year. This was accomplished with no increase in sampling intensity.

In Montana the aerial photographic missions were delayed due to contracting problems and unseasonably inclement weather. Photo interpretation is now in progress and ground surveys are planned for this spring.

SMALL-SCALE PHOTOGRAPHY FOR BARK BEETLE LOSS ASSESSMENT

Evaluation of the ability of two high resolution aerial camera systems to image bark beetle infestations from high altitudes was completed over a central Sierra Nevada test site during 1978. Results of this evaluation indicated that bark beetle-caused tree mortality could indeed be imaged from high altitudes, and clearly established the panoramic optical bar camera as a promising tool for stratification of levels of infestation over large areas and for making tree counts on small sample plots.

This work lead to acquisition of additional high altitude photo coverage of areas infested with mountain pine beetle in Montana and South Dakota during 1978, in an attempt to integrate this technology into a system for estimating annual bark beetle caused losses on a statewide basis.

Several problems still occur with panoramic photography that must be resolved before it can be considered fully operational. At present, a skilled photo interpreter using panoramic photography can classify only about one-tenth of the area that an aerial sketchmapper can cover in a single day. In addition, the continuous change in photo scale, characteristic of panoramic photography, easily can introduce error into area measurements.

FI&DM/MAG will work closely with FI&DM staffs in the Northern and Rocky Mountain Regions (Regions 1 and 2) of the Forest Service, the Nationwide Forestry Applications Program in Houston, Texas, and Geometronics specialists in the Washington Office Division of Engineering to evaluate ways to interpret optical bar panoramic photography rapidly, accurately, and efficiently.

An interesting side-light to the utilization of optical bar photography is that the FI&DM and Timber Management staffs in the Forest Service's California Region (R-5) are using optical bar panoramic photography to plan and conduct salvage operations in areas infested by bark beetles. Two overflights which encompassed most of the National Forest land in northern and central California were made during 1978. Personnel from National Forest Ranger Districts were trained in the geometry of this photography and given photo coverage of their respective Ranger Districts to use in planning and conducting timber salvage operations.

COLOR AERIAL PHOTOGRAPHY WORKSHOP

The Seventh Biennial Workshop on Color Aerial Photography in the Plant Sciences and Related Fields will be held in Davis, California, May 15-17, 1979, at the University of California at Davis. The meeting is cosponsored by the American Society of Photogrammetry, the Society of American Foresters, and the California Remote Sensing Council. Program Chairman for this workshop is Bill Ciesla, Group Leader, FI&DM/MAG.

The workshop will cover new applications of color and color IR photography in vegetation damage detection and assessment, vegetation classification, and other aspects of agriculture, forestry, and range and wildland resource management.

If you desire further information on this workshop, contact Bill Ciesla at MAG, or Mrs. Shirley Bell, Conferences and Campus Services, University of California, Davis, California 95616.

MAG STAFF ACTIVITIES

Allan T. Bullard has joined the FI&DM/MAG staff as an entomologist. Allan holds degrees from the University of Maine and Clemson University in South Carolina, where he did graduate work on pine reproduction weevils. He comes to MAG from Rickenbacker Air Force Base near Columbus, Ohio, where he was assigned to the Aerial Spray Branch and was engaged in survey and control of insects in military installations.

Allan will take over on-going work on improvement of western spruce budworm egg mass surveys and assist Region and Area FI&DM staffs in design and conduct of loss and impact evaluations.

Kim Varner has joined FI&DM/MAG under the college work/study agreement as clerk-typist. Kim is a senior sociology major at U.C. Davis, and is planning to go on to law school.

Lynne Whyte, biological technician, has accepted an appointment as entomologist with the FI&DM St. Paul Field Office, Northeastern Area.

Julie Hart, MAG clerk-typist, received a USDA Certificate of Merit and a quality step increase for sustained outstanding performance.

Bill Ciesla presented a paper on insect and disease loss assessment at the annual meeting of the Central International Forest Insect and Disease Conference in Sault Ste. Marie, Ontario, during October 1978.

Bill Ciesla participated in a Symposium on Integrated Pest Management sponsored by the Entomology Working Group of the Society of American Foresters at their national meeting in St. Louis, Missouri, during October 1978, presenting a paper entitled "Getting Results to the User".

Bob Young and Bill Klein both presented papers at the annual meeting of the Western Forest Pest Committee of the Western Forestry and Conservation Association in Sacramento, California. Bob discussed application of computerized mapping to forest insect and disease surveys, and Bill covered potential uses of high-altitude photography for mapping bark beetle infestations.

Bill Ciesla reviewed the provisions of the new Cooperative Forestry Assistance Act (PL 95-313) at the annual meetings of the California Forest Pest Action Council and the Western Forest Pest Committee of the Western Forestry and Conservation Association. Both meetings were held in Sacramento.

Jack Barry presented a lecture on FI&DM weather-related activities and weather forecasting needs to a group of National Weather Service forecaster trainees. The lecture, presented at Marana, Arizona, during September 1978, emphasized the need to use meteorological studies in planning and conducting FI&DM activities.

Jack Barry also spoke to the Forest Service Aviation Directors in Oklahoma City, Oklahoma, during October 1978 on FI&DM aircraft needs, and briefed the group on the Marsh Turbo Thrush evaluation conducted near McCall, Idaho.

RECENT PUBLICATIONS

Barry, J.W., R.B. Ekblad, G.P. Markin, G.C. Trostle (ed.). 1978. Methods for sampling and assessing deposits of insecticidal sprays released over forests. USDA Tech. Bull. 1596.

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Dumbauld, R.K., J.E. Rafferty, and J.R. Bjorklund. 1977. Prediction of spray behavior above and within a forest canopy. Special Report. Prepared under contract for USDA Expanded Douglas-fir Tussock Moth Research and Development Program, published by USDA-Forest Service FI&DM/MAG.

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Johnson, D.W., F.G. Hawksworth, and D.B. Drummond. 1978. 1977 Dwarf mistletoe loss assessment survey, Medicine Bow National Forest, Wyoming. USDA-Forest Service, FI&DM/MAG, Rpt. 78-1.

Klein, W.H., W.F. Bailey, E. Wilson, and J.E. Duggan. 1978. Efficiency of two high elevation camera systems for assessment of insect-caused tree mortality. USDA-Forest Service, FI&DM/MAG, Rpt. 78-3.

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Klein, W.H., D.L. Parker, and C.E. Jensen. 1978. Attack, emergence, and stand depletion trends of the mountain pine beetle in a lodgepole pine stand during an outbreak. Env. Entomol. 7:732-737.

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